Course Specifications

Course Title:	**Organic Reactions and Preparations**
Course Code:	**4023565-3**
Program:	**Chemistry**
Department:	**Department of Chemistry**
College:	**Faculty of Applied Sciences**
Institution:	**Umm Al-Qura University**

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A. Course Identification

1. Credit hours: 3 h (2 theoretical + 1 practical)
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 6th level / 3rd year
4. Pre-requisites for this course (if any)**:** **Heterocyclic Chemistry (4023556-3)**
5. Co-requisites for this course (if any)**:**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	75	100
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Correspondence**	-	-
5	**Other**	-	-

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	30
2	**Laboratory/Studio**	45
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	75
Other Learning Hours*		
1	**Study**	45
2	**Assignments**	10
3	**Library**	6
4	**Projects/Research Essays/Theses**	4
5	**Others** (specify)	16
	Total	81

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course includes description of organic synthesis, chemistry of different function groups. Also, involve studying the different named reactions, redox reactions and selectivity, pericyclic reactions, retrosynthetic approach and chemoselectivity

2. Course Main Objective

The course main objective is the theoretical and practical study of the different synthesis methods and reactions of different classes of organic compounds.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Identify the different classes of organic compounds depending on the functional groups	K1
1.2	Summarize the different methods used in the preparation of various organic compounds	K4
1.3	Identify the products of chemical reaction correctly	K3
1.4	Determine the type of mechanism in different organic reactions	K4
1.5	Summarize the different properties of various organic compounds and reagents	K1
1.6	List the rules of retrosynthetic approach	K2
1.7	Recognize the meaning of chemo selectivity	K1
1.8	Determine the yield percentage of the products	K5
1.9	Recall the methods of dealing with chemical hazards	K5
2	**Skills :**	
2.1	Explain the outputs of organic chemical reactions	S1
2.2	Compare between different methods to synthesis different organic compounds	S3
2.3	Demonstrate the reaction mechanisms for different organic reactions	S4
2.4	Predict the products of different organic reactions	S2
2.5	Design the different ways to prepare the functional groups of organic compounds	S7
2.6	Summarize the different methods of organic synthesis	S2
2.7	Apply the different laboratory techniques to purify the organic molecules	S7
3	**Competence:**	
3.1	Work in a team to perform a specific experimental tasks	C2
3.2	Write different reactions using different programs	C3
3.3	Communicate results of work to classmate	C2
3.4	Use the data obtained from the experiments in determining the yield percent of the prepared compounds	C4
3.5	Use the internet as a means of communication and a source of information.	C2
3.6	Use his/her observations to solve problems.	C1
3.7	Doing research for restoring information	C4
3.8	Discuss the facts to solve the difficulties.	C4

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to organic synthesis	2
2	Chemistry of functional groups: carbonyl compounds, carboxylic	4

	acids/their derivatives, amines, nitriles, and sulfides/sulfoxides.	
3	Named reactions: Aldol condensation - Claisen condensation – Claisen rearrangement - Friedel–Crafts acylation –Grignard reaction –Michael reaction – Wittig reaction – Suzuki coupling – Diels-Alder reaction.	4
4	Protection and deprotection of function groups: Hydroxyl group, carbonyl group, carboxylic group, and amino group	2
5	Redox reactions and selectivity	2
6	C-C bond formation: free radicals, enolates, coupling reaction	4
7	Pericyclic reactions	4
8	Retrosynthetic approach	4
9	Chemoselectivity	4
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	Identify the different classes of organic compounds depending on the functional groups	Lectures	Quizzes, mid and final exams
1.2	Summarize the different methods used in the preparation of various organic compounds	Scientific discussion	Quizzes, mid and final exams
1.3	Identify the products of chemical reaction correctly	Lectures	Portfolios
1.4	Determine the type of mechanism in different organic reactions	Lectures	long and short essays
1.5	Summarize the different properties of various organic compounds and reagents	Library visits	Quizzes, mid and final exams
1.6	List the rules of retrosynthetic approach	Lectures	Quizzes, mid and final exams
1.7	Recognize the meaning of chemo selectivity	Library visits	Quizzes, mid and final exams
1.8	Determine the yield percentage of the products	Lectures	Poster lab manual
1.9	Recall the methods of dealing with chemical hazards	Library visits Web-based	web-based student performance systems
2.0	**Skills**		
2.1	Explain the outputs of organic chemical reactions	Lectures	long and short essays
2.2	Compare between different methods to synthesis different organic compounds	Library visits	Portfolios
2.3	Demonstrate the reaction mechanisms for different organic reactions	Lectures and Web-based	Quizzes, mid and final exams
2.4	Predict the products of different organic reactions	Scientific discussion	Posters

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.5	Design the different ways to prepare the functional groups of organic compounds	Lectures	Scientific discussion using E-learning
2.6	Summarize the different methods of organic synthesis	Library visits Web-based	web-based student performance systems
2.7	Apply the different laboratory techniques to purify the organic molecules		Poster lab manual
3.0	**Competence**		
3.1	Work in a team to perform a specific experimental tasks	Class discussions	Performance on in-practical exams.
3.2	Write different reactions using different programs	Workshops introduced by the department	Homework
3.3	Communicate results of work to classmate		
3.4	Use the data obtained from the experiments in determining the yield percent of the prepared compounds	Research activities	Work on research activities
3.5	Use the internet as a means of communication and a source of information.	Web-based study	Evaluating the obtained web-based results
3.6	Use his/her observations to solve problems.	Scientific discussion	Individual and group presentations
3.7	Doing research for restoring information	Library visits and web-based study	Evaluating web-based student performance studies
3.8	Discuss the facts to solve the difficulties.	Research activities	Individual and group presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework, oral discussions and other activities.	Along the term	10%
2	Midterm Exam	8	20%
3	Practical exams	15	30%
4	Final exams	16-17	40%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- We have faculty members to provide counseling and advice.
- Office hours: During the working hours weekly.
- Academic Advising for students.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "*Organic Chemistry, 11th Edition, International Student Version*" 2013, John Wiley & Sons. • J. McMurry "*Organic Chemistry, 8th edition, International Edition*" 2011, Brooks/Cole
Essential References Materials	• Lecture Handouts available on the coordinator website
Electronic Materials	• http://www.chemweb.com • http://www.sciencedirect.com • http://www.rsc.org
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Classrooms capacity (30) students. • Providing hall of teaching aids including computers and projector.
Technology Resources (AV, data show, Smart Board, software, etc.)	Classrooms are equipped with data show and smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	No other requirements.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
The effectiveness of teaching and assessment by completing the questionnaire evaluation of the course	Students	Direct
The extent of achievement of course learning outcomes by independent evaluation for extent to achieve students the standards	Program leader	Indirect
Evaluation of the exam papers by other staff members	Faculty staff member	Direct
Exchange sample of assignments or exam basis	Peer Reviewer	Direct

Evaluation Areas/Issues	Evaluators	Evaluation Methods
with another staff member for the same course in other faculty.		
Hosting a visiting staff to evaluate of the course.	Faculty	Direct

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: 20/12/2019**